

Fantastic Frost Crystals on Dried Stems of Dittany

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Frost crystals on certain plants, appearing late in autumn, or in early spring are occasionally reported in botanical literature. The crystals which shoot from the bases of the stems of *Helianthemum canadense* and *majus* have given both of these species the popular name of Frostweed. Probably the same phenomenon appears on other plants, although I have not seen it reported in the manuals. Thoreau, in "Early Spring in Massachusetts," page 279, refers to "frost bodkins," needle like crystals on the roots of Herd's Grass, or Timothy, *Phleum pratense*, observed on March 29, 1859, in Concord.

I noticed an extraordinary example of such frost crystals on Dittany, *Cunila origanoides*, on November 27, on an old wood road on the east side of Kittatiny Mountain, near Mount Vernon, in Warren County, New Jersey. More than twenty of these odd forms were noted, and all were on the dead, dried stems of Dittany. Nothing of the kind was to be seen on other dead stems of herbaceous plants along the road, such as asters, goldenrod, grasses, etc. There appeared to be some reason, possibly in the square structure of the stem, some facility for capillary movement upward from the soil of moisture, which froze into these fantastic crystals, but what it may be would require some study and close observation from the moment of the beginning of the building out of these fragile and beautiful shells of ice.

The crystals appeared to have grown out from the base of the dried stems, an inch or two above the ground. In height, vertically, along the stem, they were 2 or 3 inches. Their width was from 2 to 4 inches; their thickness about 1-32 of an inch. In structure, they suggested the concentric curves of the bracket fungus, built out horizontally by curving lines of cell growth from a base on a dead or diseased tree.

These ice crystals seemed to have grown in similar concentric curves, but vertically, beginning with a band $\frac{1}{2}$ inch to 1 long, where moisture issuing from the stem froze, and then another froze over it and so on. Some of these flat, vertically placed crystals showed a dozen or more such bands, from 1-32 to 1-16 and 1-8 inch wide increasing in width from the stem outward. The outer edge tended to be wavy, fluted or crisped. Sometimes

two or three of the vertical plates of ice were grown together at their outer edges, making an appearance like a clam or mussel shell. Some of them were folded back on each other, like the old-fashioned, ribbon-like, Christmas candy. Some were waved and curled like potato chips.



Frost crystals on Dittany stem.
Two crystals fused at right angles.

It was noticeable that most of them had grown out in the same general direction, toward the downhill slope of the old road, which ran east. Whether this was due to the direction of the wind at the time of freezing, or to some downhill draft in the narrow valley, is a question. The temperature had fallen suddenly during the night from a point above freezing at sunset to about 25° at dawn, and during the day it fell a few degrees lower. The ground had been wet from recent rains, and the dead leaves, recently fallen, and the dried stalks of various herbaceous plants had absorbed a lot of moisture, and were frozen

stiff but none showed any frost crystals but the stems of the colony of Dittany, strung for a hundred feet along the road.

These crystals were quite different in appearance from those which I recall seeing on the base of Frostweed stems, in New England, years ago; those of *Helianthemum* were narrower, curled and twisted; these growths on the Dittany were uniformly flat vertical plates, although varying in width and height and in fluting and waving of their outer edges. They did not appear to have started freezing from any small, central point, such as a break or node in the stem, but along a vertical distance of half an inch or more. Can anyone offer an explanation as to the mechanics of this phenomenon?

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